

**PLANETARY PROTECTION MEASURES FOR MARS SAMPLE RETURN.** K. H. Nealson<sup>1</sup> (Chair), M. H. Carr<sup>2</sup>, B. C. Clark<sup>3</sup>, R. F. Doolittle<sup>4</sup>, B. M. Jakosky<sup>5</sup>, E. L. Korwek<sup>6</sup>, N. R. Pace<sup>7</sup>, J. S. Poindexter<sup>8</sup>, M. S. Race<sup>9</sup>, A. L. Reysenbach<sup>10</sup>, J. W. Schopf<sup>11</sup>, T. O. Stevens<sup>12</sup>. <sup>1</sup> Center for Great Lakes Studies, University of Wisconsin-Milwaukee, 600 E. Greenfield Ave., Milwaukee, WI 53204, knealson@csd.uwm.edu, <sup>2</sup> U. S. Geological Survey, Mail Stop 975, 345 Middlefield Rd., Menlo Park, CA 94025, carr@astmnl.wr.usgs.gov, <sup>3</sup> Lockheed Martin Astronomics, Mail Stop S8001, P. O. Box 179, Denver, CO 80201, bclark@den.mmc.com, <sup>4</sup> Center for Molecular Genetics, University of California at San Diego, 9500 Gilman Dr., La Jolla, CA 92093-0634, rdoolittle@ucsd.edu, <sup>5</sup> Laboratory for Atmospheric and Space Physics, University of Colorado, Campus Box 392, Boulder, CO 80309-0392, jakosky@argyre.colorado.edu., <sup>6</sup> Law Offices of Hogan & Hartson L.L.P., 555 Thirteenth St., N.W., Washington, DC 20004, elk@dc2.hhlaw.com, <sup>7</sup> Dept. of Plant and Microbial Biology, 111 Koshland Hall, University of California at Berkeley, Berkeley, CA 94720, nrpace@nature.berkeley.edu, <sup>8</sup> Dept. of Biological Sciences, Barnard College / Columbia University, 3009 Broadway, New York, NY 10027-6598, jpoindexter@barnard.columbia.edu, <sup>9</sup> 30 Windsong Way, Lafayette, CA 94549, mracemom@aol.com, <sup>10</sup> Dept. of Biochemistry and Microbiology, Cook Campus, Rutgers University, New Brunswick, NJ 08903, alr@imcs.rutgers.edu, <sup>11</sup> Center for the Study of Evolution and the Origin of Life, University of California at Los Angeles, Los Angeles, CA 90024, schopf@ess.ucla.edu, <sup>12</sup> Pacific Northwest Laboratory, P7-54, P.O. Box 999, Richland, WA 99352, to\_stevens@pnl.gov.

The Space Studies Board of the National Academy of Sciences serves as the primary adviser to NASA on planetary protection policy, which seeks to preserve conditions for future exploration of planets and other solar system objects, including the search for life, evidence of past life, or prebiotic chemistry, and to protect Earth and its biosphere from potential extraterrestrial sources of contamination. In 1992, the Space Studies Board published its report, *Biological Contamination of Mars: Issues and Recommendations*, which provided the basis for a modification of the planetary protection requirements for Mars lander missions. With the initiation of the Mars Surveyor series of missions and of several other planned sample-return missions to other near-Earth solar system objects, there is a need for an analysis of issues related to the potential for back-contamination of the Earth.

NASA requested that a study be undertaken to survey and assess the state of knowledge in the areas below, recognizing that this knowledge is presently incomplete in many respects. The Space Studies Board was asked to identify areas where preparatory research and/or planning are necessary to enhance our readiness to undertake a sample return program. Issues include:

- 1) The potential for a living entity to be included in a sample to be returned from another solar system body, in particular Mars;
- 2) Scientific investigations that should be conducted to reduce the uncertainty in the above assessment;
- 3) The potential for large-scale effects on the terrestrial environment resulting from release of any returned entity;
- 4) The status of technological measures that could be taken on a mission to prevent the unintended release of a returned sample into the Earth's biosphere; and
- 5) Criteria for controlled distribution of sample material, taking note of the anticipated regulatory framework.

The Space Studies Board will publish its report, *Mars Sample Return: Issues and Recommendations*, in February, 1997. The report details the scientific basis for implementing planetary protection measures in any Mars sample return mission, and makes specific recommendations as to how such measures might best be undertaken. Members of the committee that authored the report will discuss its contents and implications.